

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/38691

A. CLASSIFICATION OF SUBJECT MATTER  
IPC(7) : C08L 81/06; H01M 6/18, 8/10  
US CL : 429/33, 314; 525/534, 535

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
U.S. : 429/33, 314; 525/534, 535

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2003/46080 A1 (KINOCHI et al.) 05 June 2003 (05.06.2003), page 2, paragraphs 18 and 19 and page 15, paragraphs 212-214.	4-9
X	US 2002/0091225 A1 (MCGRATH et al.) 11 July 2002 (11.07.2002), page 1, paragraph 3, page 2, top chemical structure and paragraph 14.	4-9
Y	US 6,503,378 A (FISHER) 07 January 2003 (07.01.2003), column 2, lines 28-34; column 4, lines 11-16 and 18-28.	1-3
X	US 5,128,378 A (SUGAYA et al.) 07 July 1992 (07.07.1992), column 1, lines 10-11; column 2, lines 19-25; column 3, lines 18-23 and 31-47; and column 4, lines 10-18.	4-7
Y	US 5,115,082 A (MERCER et al.) 19 May 1992 (19.05.1992), column 6, repeating unit (A), column 12, lines 38-45 and column 12, lines 20-21.	4-7
P,X	CAPLUS accession no. 2004:234147, Ghassemi et al., New multiblock copolymers containing hydrophilic-hydrophobic segments for proton exchange membranes, Polymer Preprints, 2004, Vol. 45, No. 1.	1-3
		1-9

☒ Further documents are listed in the continuation of Box C.

Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

☐

See patent family annex.

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search  
24 August 2005 (24.08.2005)

Name and mailing address of the ISA/US  
Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Form PCT/ISA/210 (second sheet) (January 2004)

Date of mailing of the international search report

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14 SEP 2005

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## C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	Lee et al., Preparation and evaluation of sulfonated-fluorinated poly(arylene ether)s membranes for a proton exchange membrane fuel cell (PEMFC), Electrochimica Acta 49, 14 January 2004, pages 2315-2323.	4-9
P,X	US 2004/0186262 A1 (MAIER et al.) 23 September 2004 (23.09.2004), page 1, paragraphs 7-12.	4-9
P,X	US 2004/0101730 A1 (HIRANO et al.) 27 May 2004 (27.05.2004), page 2, paragraphs 16 and 18; and page 4, paragraphs 56-57.	4-7 and 9
P,A	CAPLUS accession no. 2003:211268, WILES et al., Poly(arylene thioether sulfone) copolymers for PEM-based fuel cell systems, Polymer Preprints, 2003, Vol. 44, No. 1.	4-9
P,A	CAPLUS accession no. 2004:234143, BAI et al., Properties and proton conductivities of highly sulfonated polyarylenethioethersulfones for fuel cells, Polymer Preprints, 2004, Vol. 45, No. 1.	4-7 and 9

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## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.: 1-9
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐  
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

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Continuation of B. FIELDS SEARCHED Item 3:

CAS Online: Files REG and CAPLUS

EAST: Databases US-PGPUB, USPAT, USOCR, EPO, JPO, DERWENT and IBM-TDB